# Norban Comtex Ltd. (Extension)

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(23.976284, 90.264089)

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## 1. Building Information

**Building – 1 (08 storied Industrial Building):** An eight-storied (G+7) reinforced concrete building.

**Building – 2 (33KV sub-station Building):** A single-storied reinforced concrete building.

**Building 3 (11KV Substation Building):** This building is a single-storied reinforced concrete (RC) building.

**Building 4 (New Garments Building):** This building is a partially seven-storied (B+G+6) reinforced concrete (RC) building.

**Building 5 (AA-ETP Building):** This building is a two-storied (G+1) reinforced concrete (RC) building.

**Building 6 (Toilet Block-1):** This building is a single-storied reinforced concrete (RC) building.

**Building – 7 (ATM BOOTH):** A single-storied reinforced concrete building.

**Building 8 (Extension WTP building):** This building is a single-storied reinforced concrete (RC) building with an underground water reservoir.

**Building – 9 (Toilet Block-2):** A single-storied reinforced concrete building.

**Shed-1 (Dyeing Finishing Shed):** This structure is a single-storied prefabricated steel shed.

**Shed-2 (Jhute Godown):** This structure is a single-storied roof truss shed with a masonry wall.

**Shed-3 (Fire Pump and Boiler Room):** This structure is a single-storied prefabricated steel shed with an RC column at one side with an underground RC water reservoir.

**Shed – 4 (Empty Chemical Drum Shed):** A single-storied steel shed.

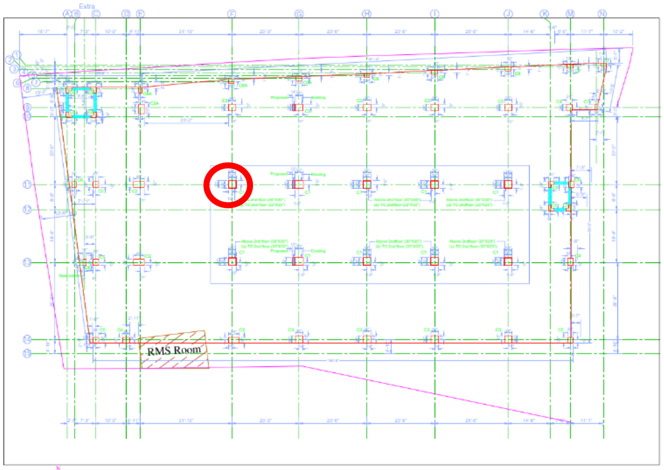
**Shed – 5 (Locker Shed-2):** A single-storied steel shed.

**Shed – 6 (New Workshop):** A single-storied steel shed.

**Shed – 7 (Jhute sorting shed):** A single-storied steel shed.

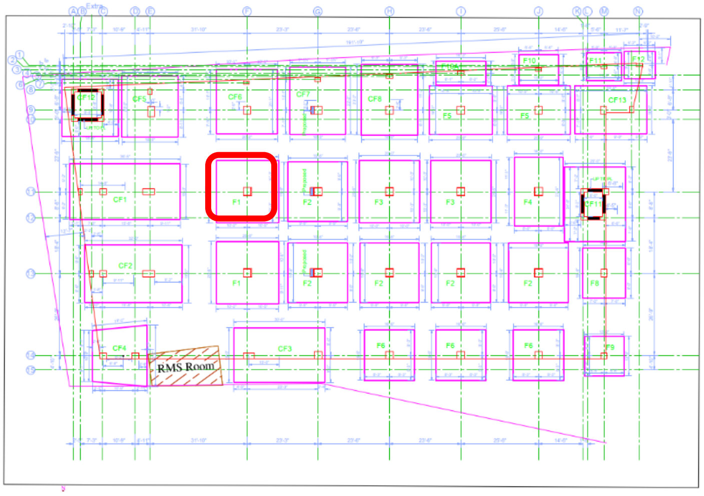
## 2. Observations

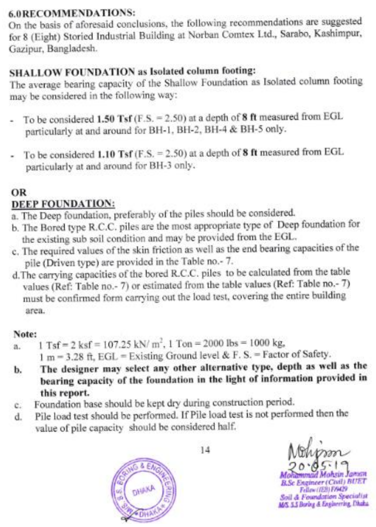
**<u>Observation-1:</u>** Stress in column exceeds normal design limit. (Building – 1)




**Description:** The cursory calculation indicates that the red mark column stress exceeds the normal design limit considering a typical floor live load of 6kPa, roof live load of 1.5 kPa, and minimum concrete strength based on aggregate type. The building engineer is required to review the design, loads, and column stresses for the marked columns based on in-situ material strength.

**<u>Observation-2:</u>** The foundation found to be stressed. (Building – 1)



**6.0RECOMMENDATIONS:**
On the basis of aforesaid conclusions, the following recommendations are suggested for 8 (Eight) Storied Industrial Building at Norban Comtex Ltd., Sarabo, Kashimpur, Gazipur, Bangladesh.

**SHALLOW FOUNDATION as Isolated column footing:**
The average bearing capacity of the Shallow Foundation as Isolated column footing may be considered in the following way:

- To be considered **1.50 Tsf** (F.S. = 2.50) at a depth of **8 ft** measured from EGL particularly at and around for BH-1, BH-2, BH-4 & BH-5 only.
- To be considered **1.10 Tsf** (F.S. = 2.50) at a depth of **8 ft** measured from EGL particularly at and around for BH-3 only.

**OR**
**<u>DEEP FOUNDATION:</u>**
a. The Deep foundation, preferably of the piles should be considered.
b. The Bored type R.C.C. piles are the most appropriate type of Deep foundation for the existing sub soil condition and may be provided from the EGL.
c. The required values of the skin friction as well as the end bearing capacities of the pile (Driven type) are provided in the Table no.- 7.
d. The carrying capacities of the bored R.C.C. piles to be calculated from the table values (Ref: Table no.- 7) or estimated from the table values (Ref: Table no.- 7) must be confirmed form carrying out the load test, covering the entire building area.

**Note:**
a. 1 Tsf = 2 ksf = 107.25 kN/ $m^2$, 1 Ton = 2000 lbs = 1000 kg, 1 m = 3.28 ft, EGL = Existing Ground level & F. S. = Factor of Safety.
b. **The designer may select any other alternative type, depth as well as the bearing capacity of the foundation in the light of information provided in this report.**
c. Foundation base should be kept dry during construction period.
d. Pile load test should be performed. If Pile load test is not performed then the value of pile capacity should be considered half.

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**Description:** Cursory calculation indicates the highlighted foundation is inadequate for bearing. The loading is considered 6kPa for a typical floor and the allowable bearing capacity of soil is **1.5 tsf (FS: 2.5)** at 2.4 m depth. The building engineer is required to verify in-situ material strength and review the design load and foundation stresses.

**Observation 3:** Dampness and water leakage from overhead water tank. (Building – 1).

**Description:** During the inspection, Dampness and water leakage from the overhead water tank were observed. The building engineer is required to seal the leakage and repair the damp portion of the wall and slab.

**Observation 4:** Unbraced storage racks (Building – 1).

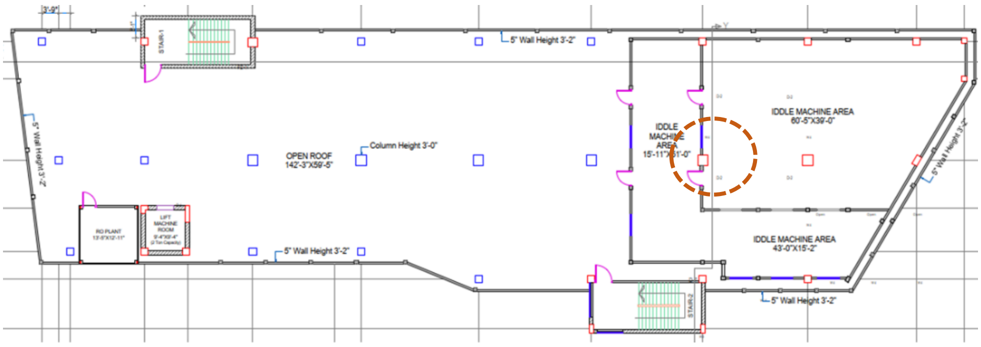
Unbraced storage racks

**Description:** Storage racks at several locations were found unbraced. The building engineer is required to brace/anchor all the non-structural elements including the storage racks.

**Observation 5:** Lack of design report (Building – 2)

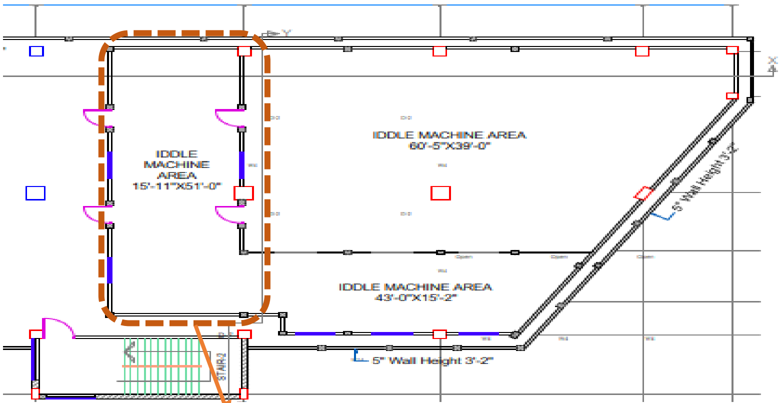
**Description:** As per BNBC, every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, a design report was not available which is required to be prepared in compliance with section 1.9.1.1 (part 6, BNBC).

**Observation-6:** Stress in the column and foundation exceeds the normal design limit (Building – 4).




**Description:** Cursory calculation shows that stress in marked column and pile exceeds normal design limit considering dead load and live load (as per load plan) and minimum concrete strength (16.3 MPa) based on aggregates type, 415MPa rebar strength. The building engineer is required to review the design, load and column stress based on the in-situ material strength by taking a minimum of 4 numbers of 100mm dia. core from the lower tier of the building.

**Observation-7:** Apparently inadequate connection in the roof shed (Building – 4).




Non-engineered shed over idle machine room.

Roof truss to wall connection

**Description:** During the inspection, a non-engineered shed and inadequate truss-to-wall connection were observed on the roof shed. The building engineer is required to check the connection adequacy of the truss and non-engineered shed.

**Observation-8:** Crack in the Brick wall (Building – 4).

**Description:** During the inspection, cracks were observed in the connection between the brick wall and structural elements. The building engineer is required to investigate the crack and repair the crack appropriately.

**Observation-9:** Lack of lateral stability (Shed-1).


**Description:** Load transfer media is not provided along the ridge and at end bays. The building engineer is required to check the lateral stability of the structure.

**Observation-10:** Corrosion on steel members (Shed-1).

**Description:** Corrosion was found on steel members at several locations. The building engineer is required to provide rust-proof paint on steel members.

**Observation-11:** Lack of lateral stability (Shed-3).

**Description:** Load transfer media is not provided along the periphery on the east side. The building engineer is required to check the lateral stability of the structure.

**Observation 12:** Corrosion on steel member. (Shed – 5 & Shed – 2)

**Description:** Severe corrosion was observed on steel members. The building engineer is required to remove the corrosion and provide a rust-proof coating on all steel members to protect from corrosion.

**Observation 13:** Lack of lateral stability. (Shed – 4)

**Description:** Lack of lateral stability system (absence of load transfer media) & improper connections were observed in the structure. The building engineer is required to check the lateral stability of the structure

**Observation 14:** Lack of lateral stability. (Shed – 6)


**Description:** Lack of lateral stability system (absence of load transfer media) & improper connections were observed in the structure. The building engineer is required to check the lateral stability of the structure

**Observation 15:** Lack of lateral stability. (Shed – 7)


**Description:** Lack of lateral stability system (absence of load transfer media) & improper connections were observed in the structure. The building engineer is required to check the lateral stability of the structure

## 3. Action Plan

| Observation | Action Plan | Timeline |
|---|---|---|
| Stress in the column exceeds the normal design limit. (Building – 1) | Verify in-situ material strength by taking a minimum 4-100mm dia. core from the lower tier of the building. | within 6 weeks |
| | Building engineer is required to review the design load. | within 6 weeks |
| | Produce and actively manage a loading plan for all floor plates within the factory, considering floor and column capacity. | within 6 weeks |
| | Carry out the suggested remedial works if required. | within 6 months |
| Foundation found to be stressed. (Building – 1) | Verify in-situ material strength. | within 6 weeks |
| | Building engineer is required to review the design load and foundation stresses. | within 6 weeks |
| | Produce and actively manage a loading plan for all floor plates within the factory, considering floor, column, and foundation capacity. | within 6 weeks |
| | Carry out the suggested remedial works if required. | within 6 months |
| Dampness and water leakage from overhead water tank. (Building – 1). | The building engineer is required to seal the leakage and repair the damp portion of the wall and slab. | within 6 weeks |
| Unbraced storage racks (Building – 1). | The building engineer is required to brace/anchor all the non-structural elements including the storage racks. | within 6 weeks |
| Lack of design report (Building – 2) | The building engineer is required to prepare design documents and submit to RSC for review. | within 6 weeks |
| | Carry out remedial work where required. | within 6 months |
| Stress in the column and foundation exceeds the normal design limit (Building – 4). | Verify in-situ material strength by taking a minimum 4-100mm dia. core from the lower tier of the building. | within 6 weeks |
| | The building engineer is required to review the design, loads, and column stresses based on in-situ material strength. | within 6 weeks |
| | Carry out suggested remedial works if required. | within 6 months |
| Apparently inadequate connection in the roof shed. (Building – 4). | The building engineer is required to check the connection adequacy of the truss and non-engineered shed. | within 6 weeks |
| | Carry out suggested remedial works if required. | within 6 months |

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|---|---|---|
| Crack in Brick wall (Building – 4). | The building engineer is required to investigate the crack and repair the crack appropriately. | within 6 weeks |
| Lack of lateral stability (Shed-1). | The building engineer is required to check the lateral stability of the structure. | within 6 weeks |
| | Implement remediation work if required. | within 6 months |
| Corrosion on steel members (Shed-1). | The building engineer is required to provide rust-proof paint on steel members. | within 6 weeks |
| Lack of lateral stability (Shed-3). | The building engineer is required to check the lateral stability of the structure. | within 6 weeks |
| | Implement remediation work if required. | within 6 months |
| Corrosion on steel member. (Shed – 5 & Shed – 2) | The building engineer is required to remove the corrosion and provide a rust-proof coating on all steel members to protect from corrosion. | within 6 weeks |
| Lack of lateral stability. (Shed – 4) | The building engineer is required to check the lateral stability of the structure | within 6 weeks |
| | Carry out remedial work where required. | within 6 months |
| Lack of lateral stability. (Shed – 6) | The building engineer is required to check the lateral stability of the structure | within 6 weeks |
| | Carry out remedial work where required. | within 6 months |
| Lack of lateral stability. (Shed – 7) | The building engineer is required to check the lateral stability of the structure | within 6 weeks |
| | Carry out remedial work where required. | within 6 months |